

CLAIMS

1. A sealing apparatus for high-pressure and high-temperature processes, in particular for hot isostatic pressing processes, comprising:
  - a container (2) for high pressures defining a volume (4) adapted to contain a material to be pressurised and provided with an inlet (6) for the introduction of the material into said volume,
  - a moving head (10) adapted hermetically to close the high-pressure container (2), and
  - a piston (12) mounted to slide in a leak-tight manner through the head (10) and moving between a retracted position and a forward position in which it places the inner volume (4) of the container (2) under pressure,characterised in that it comprises an auxiliary cover (22), which can be associated in a leak-tight manner with the inlet (6) of the high-pressure container (2), in a position interposed between the container (2) and the head (10), said cover (22) being provided with an opening (24) in which the piston (12) can slide and coinable sealing means (28) associated with the opening (24, 26) in order to provide a pressurised seal between the piston (12) and the auxiliary cover (22) in the position in which the moving head (10) hermetically closes the container (2).
2. An apparatus as claimed in claim 1, characterised in that the moving head (10) comprises coining means (20, 30) adapted to cause the plastic deformation of said sealing means (28) in its position hermetically closing the container (2).
3. An apparatus as claimed in claims 1 or 2, characterised in that the coining means (20, 30) comprise an annular insert

(20) associated with the head (10) and having an axial opening in which the piston (12) can slide, said insert comprising, on its side facing the auxiliary cover (22), an annular end (30) adapted to engage a seat (26) provided in the opening (24) of the auxiliary cover (22) in order to enable the coining of the coinable sealing means (28) housed in the seat (26).

4. An apparatus as claimed in any one of the preceding claims, comprising a sealing gasket (8) interposed between the auxiliary cover (22) and the contour of the inlet (6) of the container (2).

5. An apparatus as claimed in any one of the preceding claims, characterised in that the piston (12) is mounted to slide in the head (10) via a bushing (14).

6. An apparatus as claimed in any one of the preceding claims, characterised in that the coinable sealing means (28) comprise an annular gasket (8) of copper or aluminium.

7. An apparatus as claimed in any one of the preceding claims, characterised in that the auxiliary cover (22) can move vertically and/or horizontally with respect to the container (2).

8. A high-pressure and high-temperature pressing method, using a high-pressure and high-temperature container (2) defining a volume (4) adapted to contain the material to be pressurised and provided with an inlet (6) for the introduction of the material into this volume (4) and a moving head (10) adapted to hermetically close the high-pressure container (2), provided with a piston (12) mounted

to slide in a leak-tight manner through the head (10) and moving between a retracted position and a forward position in which it places the inner volume (4) of the container (2) under pressure, characterised in that it comprises the operations of:

- disposing an auxiliary cover (22) which may be associated in a leak-tight manner with the inlet (6) of the container (2) in a position interposed between the container (2) and the head (10), the cover (22) being provided with an opening (24) in which the piston (12) can slide in a leak-tight manner and with coinable sealing means (28) associated with said opening (24, 26),
- positioning the auxiliary cover (22) to bear on the container (2), and
- carrying out the coining in situ of these coinable sealing means (28) by actuating the moving head (10) in its position hermetically closing the container (2).

9. A method as claimed in claim 8, characterised in that once coining of the sealing means (28) has taken place, it further comprises the operations of:

- pressurising the inner volume (4) of the container (2) by advancing the piston (12) within said volume (4),
- maintaining the container (2) under pressure for a desired cycle time,
- depressurising the container (2) by extracting the piston (12),
- moving the head (10) into the open configuration of the container (2), and
- moving the auxiliary cover (22) in order to insert new coinable sealing means (28).

10. A method as claimed in claims 8 or 9, in which the coinable sealing means (28) are formed by a copper or aluminium gasket.

11. A sealing system for a container (2) containing a fluid at high pressure, comprising a head (10) moving between a closed position and an open position of the container (2), a piston (12) for the pressurisation of the container (2) mounted to slide within the head (10) and sealing means adapted to prevent fluid from emerging from the pressurised container (2), characterised in that the sealing means comprise an auxiliary cover (22) adapted to be interposed between the head (10) and the container (2), provided with an opening (24) in which the piston (12) may slide and a coinable gasket (28) associated with the opening (24) adapted after its coining to exert a sliding seal between the piston (12) and the cover (22).